

CLAIMS:

1. A method for manufacturing a mask blank having a thin film for forming a mask pattern on a substrate, wherein the thin film is formed by a sputtering method using a sputtering target containing silicon, and the sputtering target has a hardness of 900HV or more in Vickers' hardness.
2. The method for manufacturing the mask blank according to claim 1, wherein the sputtering target has the hardness of 980HV or more in Vickers' hardness.
3. The method for manufacturing the mask blank according to either of claim 1 or claim 2, wherein the thin film is formed by a reactive sputtering method in an atmosphere containing oxygen and/or nitrogen.
4. The method for manufacturing the mask blank according to any one of claim 1 to claim 3, wherein the sputtering target contains the silicon of 70 to 95 atm%.
5. The method for manufacturing the mask blank according to any one of claim 1 to claim 4, wherein the thin film is a light semi-transmitting film and the mask blank is a phase shift mask blank.
6. The method for manufacturing the mask blank according to any one of claim 1 to claim 5, wherein a metal film is formed on the thin film.

7. A method for manufacturing a transfer mask by patterning the thin film of the mask blank manufactured by the manufacturing method of any one of claims 1 to 6.
- 5 8. A sputtering target for manufacturing a mask blank containing silicon, wherein a hardness of the target is 900 HV or more in Vickers' hardness.
9. The sputtering target for manufacturing the mask blank according to claim 8, wherein the sputtering target contains a metal silicide compound.
- 10 10. The sputtering target for manufacturing the mask blank according to either of claim 8 or claim 9, wherein the sputtering target contains the silicon of 70 to 95 atm%.
- 15 11. A method for manufacturing a phase shift mask blank by sputtering in an atmosphere containing oxygen and/or nitrogen using a target containing metal and silicon to deposit a light semi-transmitting film containing metal, silicon, and oxygen and/or nitrogen on a transparent substrate, wherein by using correlation that exists between the light semi-transmitting film and a
- 20 rate of generating defects, the light semi-transmitting film is deposited, using the target having a predetermined hardness so that the rate of generating the defects is set to be a desired value or less.